

an array element connected in parallel to that portion of the signal path comprising the molecular binding region, the array element having an operational state for supporting the propagation of an electromagnetic signal therethrough in parallel to that portion of the signal path comprising the molecular binding region.

35. The bio-assay of claim 34, wherein at least a portion of the signal path comprises:

- a transmission line;
- a ground element; and
- a dielectric layer attached between the transmission line and ground element.

36. The bio-assay of claim 35, wherein the at least a portion of the signal path comprises a coplanar waveguide transmission line structure.

37. The bio-assay of claim 35, wherein the at least a portion of the signal path comprises a microstrip transmission line structure.

38. The bio-assay of claim 35, wherein the at least a portion of the signal path comprises a coaxial transmission line structure.

39. The bio-assay of claim 35, wherein the at least a portion of the signal path comprises a slotline structure.

40. The bio-assay of claim 34, wherein the array element comprises a transistor.

41. The bio-assay of claim 34, wherein the array element comprises a diode.

42. The bio-assay of claim 34, wherein the array element comprises a photo-sensitive switching element.

43. The bio-assay of claim 34, wherein the array element comprises an addressable bypass switch.

44. The bio-assay of claim 34, wherein the array element comprises a micro-electromechanical systems switch.

45. The bio-assay of claim 34, wherein the signal path and the array element are integrally formed.

46. The bio-assay of claim 34, wherein the molecular binding region comprises a drug receptor.

47. The bio-assay of claim 34, wherein the molecular binding region comprises one or more cells.

48. A bio-assay array, comprising:
a plurality of signal paths, each of the signal paths operable to support the propagation of an electromagnetic signal therealong and comprising a molecular binding region;
a plurality of molecular binding regions, each molecular binding region coupled to at least a portion of one of a respective plurality of signal paths; and
a plurality of array elements, each array element connected in parallel to one of the respective plurality signal path portions comprising the molecular binding region, each array element having an operational state for supporting the propagation of an electromagnetic signal therethrough in parallel to the signal path portion comprising the molecular binding region.

49. The bio-assay array of claim 48, further comprising:
a first switch having a first port and a plurality of second ports, each one of the plurality of the second ports coupled to one of a respective plurality of the signal paths;
a second switch having a plurality of first ports and a second port, each one of the plurality of first ports coupled to one of a respective plurality of the signal paths.

50. The bio-assay array of claim 48, wherein each of the plurality of signal paths comprises:

- a transmission line;
- a ground element; and
- a dielectric layer attached between the transmission line and ground element.

51. The bio-assay array of claim 48, wherein each of the plurality of array elements comprises a transistor.

52. The bio-assay array of claim 48, wherein each of the plurality of array elements comprises a micro-electromechanical systems switch.

53. The bio-assay array of claim 48, wherein at least one of the plurality molecular binding regions comprises a drug receptor.

54. The bio-assay array of claim 48, wherein at least one of the molecular binding regions comprises one or more cells.

Please cancel claims 1-5, 8, 11, 14, 17, 20-25, 28, and 31-33 without prejudice.